

IN THE  
**Supreme Court of the United States**

OCTOBER TERM, 1942

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Nos. 369 and 373

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MARCONI WIRELESS TELEGRAPH COMPANY  
OF AMERICA,

*Petitioner and Cross-Respondent,*

*vs.*

THE UNITED STATES,

*Respondent and Cross-Petitioner.*

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**REPLY BRIEF FOR PETITIONER AND CROSS-  
RESPONDENT**

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**REPLY BRIEF FOR PETITIONER AND CROSS-  
RESPONDENT**

This reply brief will deal with the issues in both cases, Nos. 369 and 373, namely, the broad claims of the Marconi patent and the Fleming patent, No. 369, and claim 16 of the Marconi patent, No. 373.

**I. Marconi 763,772, broad claims.**

**A. The claims were valid.**

The broad claims in suit of Marconi patent 763,772 were held invalid by the Court of Claims.

There is no dispute concerning the teaching of the Marconi patent, which discloses and claims a tuned transmitting antenna circuit, an associated tuned circuit (to

produce radio frequency currents), a tuned receiving antenna circuit, and an associated tuned circuit (to detect radio frequency currents).

Nor is there much serious dispute concerning what the prior art discloses, although here it will be necessary, as will be pointed out, sometimes to distinguish between that disclosure and defendant's inferences therefrom.

Clerk Maxwell in 1865 published a mathematical theory of electro-magnetic waves, usually referred to as the electro-magnetic theory of light, but he did not disclose "the theory of wireless telegraphy", as defendant's brief asserts (p. 30) nor even mention that art.

Hertz, in the period of 1879 to 1886 (5 R. 3872) discovered that it was possible to produce electro-magnetic waves of substantial strength, and defendant's brief (p. 33 *et seq.*) says he understood something about tuning. However, whether he did or not is unimportant because Lodge, earlier than Marconi, clearly understood the then familiar principles of tuning and knew that tuned circuits were sometimes desirable in wireless telegraphy, as defendant states (brief, p. 35), and plaintiff agrees.

The prior Marconi patent 586,193, formerly in this suit, as reissue 11,913 (4 R. 2567), is referred to in defendant's brief (p. 39), but it did not have any tuned circuits, nor does defendant so claim.

The prior art against the Marconi patent relied upon by defendant are Tesla 645,576, Lodge 609,154, Marconi 627,650, and the Stone patent 714,756 and letters. None of these is new here, each having been before one or more courts which sustained the Marconi patent. Before considering this prior art, it may not be amiss to state briefly the test to be applied to it.

*Anticipating disclosures must be substantially the same in structure, mode of operation and effect.*

This well established principle is recognized in defendant's brief (p. 42), stating

"the propriety of the conclusion below that the prior art invalidated Marconi's patent depends upon whether the anticipating disclosures and Marconi's device were substantially the same in structure, mode of operation and effect."

To the same effect are decisions of this Court, including *Clough v. Barker*, 106 U. S. 166, 176:

"The structure was not designed for the same purpose as Clough's, no person looking at it or using it would understand that it was to be used in the way Clough's is used, and it is not shown to have been really used and operated in that way."

*Topliff v. Topliff*, 145 U. S. 156, 161:

"It is not sufficient to constitute an anticipation that the device relied upon might, by modification, be made to accomplish the function performed by the patent in question, if it were not designed by its maker, nor adapted, nor actually used, for the performance of such functions."

We shall turn now to the prior art relied upon by defendant.

#### 1. TESLA PATENT 645,576.

The Tesla patent 645,576 (5 R. 3602) has no relation to the Clerk Maxwell, Hertz, Lodge or Marconi electromagnetic work, nor to ether (Hertzian) waves, which Tesla

considered "practically impossible" for his purpose (Tesla pat., pliff's. main brief, pp. 26, 27). Tesla proposed instead to produce a current, and to conduct it over wires and a conducting strata of air, like "a copper wire" (Tesla pat., p. 3, l. 101; 5 R. 3605), to the place where it was to operate motors or lamps. He did not contemplate "the transmission of waves", as defendant's brief asserts (p. 44), but merely currents over conductors.

Tesla did not tune his transmitting wire or his receiving wire, because the wires were part of a power line, as in the ordinary power line system of today. That is the reason why he neither shows a variable inductance coil or other variable element in the wires nor says that they are tunable (they could not be tuned). He did want maximum voltage in his circuits, which he obtained by synchronized circuits (pliff's. main brief, p. 29 *et seq.*).

The conclusions of the Patent Office and of the courts in the French, National and Kilbourne & Clark suits (pliff's. main brief, pp. 31, 32) that Tesla did not invalidate the Marconi patent were right.

## (2) LODGE PATENT 609,154.

Lodge patent 609,154 (4 R. 2579) discloses a tuned antenna, for either a transmitter or a receiver, the tuning being by a variable inductance coil. Lodge also had closed circuits (the antenna is an open circuit) associated with his antennas, but the closed circuits were not tuned (pliff's. main brief, p. 33), nor does defendant's brief so assert (p. 46 *et seq.*).

As defendant's brief states (pp. 35, 36), Lodge fully understood the principles of tuning or resonance, which, of course, had long been familiar knowledge among physicists.



but what Lodge did not know was what electrical circuits should be tuned, to accomplish the great advance in the art obtained by the Marconi invention. Electrical systems are like other physical systems, and some parts should be tuned to certain frequencies, other parts to other frequencies and some not to any frequency. The knowledge that tuning is possible is not enough—there is also required the knowledge of whether or not to tune and how much. The fact that Lodge, a brilliant worker in the wireless and other fields, did not understand the importance of tuning the associated circuits argues strongly for invention. "How then can I treat as obvious at the latter date what so able a man as Lodge entirely failed to see at the former date," Justice Parker, *Marconi v. British, etc. Co.*, 4 R. 2546.

### 3. MARCONI PATENT 627,650.

Marconi patent 627,650 (5 R. 4085) has a receiving system, in which the open (antenna) circuit is tuned, but an associated closed (detector) circuit which is not tuned, as found by the Court of Claims, saying "It was not known to Marconi at the time this patent was filed that it was desirable to have the closed oscillating circuit in tune with the open oscillating circuit" (finding LII, 1 R. 47).

Defendant's brief (p. 55) contends that the closed circuit was tuned, because its witness Loftin said it was, defendant asserting that plaintiff's witness was wrong in saying that it was not. But the Court of Claims found, as above stated, that this circuit was not tuned, agreeing in effect with the Patent Office which considered this Marconi patent before granting the Marconi claims in suit (Marconi application history, 5 R. 3993).

#### 4. STONE PATENT AND LETTERS.

Stone patent 714,756 (5 R. 3648), as originally filed, did not describe tuning the antenna, but only the associated closed circuit. The application was filed on February 8, 1900, the Marconi British patent corresponding to the Marconi patent in suit here was published on May 4, 1901 (1 R. 52), and on and after April 8, 1902 Stone amended his application to describe tuning the antenna (Court of Claims finding, 1 R. 4; Stone application history, 5 R. 3723 *et seq.*).

Defendant's brief says that Stone disclosed a system of four circuit tuning "which the court below held anticipated Marconi", and in which Stone "preferably adjusted the antenna circuit to be resonant to the same frequency" as the closed circuit, defendant's brief (p. 59) quoting three portions from the specification of the Stone patent. But the first two quotations, which describe a preferable antenna tuning (pat., p. 2, ll. 16-20; 5 R. 3649, and p. 6, ll. 62-66, 5 R. 3653) were added in April 1902 or later (Court of Claims finding, 1 R. 51), and the third quotation (pat., p. 4, ll. 17-36; 5 R. 3651) does not mention the antenna, but merely says that the "apparatus" can be tuned to a desired frequency, which was done by the tuning of the closed circuit. "Stone's application as filed was primarily concerned with having the *closed*\* circuits in tune at both stations", (Court of Claims finding, 1 R. 52, plff's. main brief, p. 37).

Defendant's brief (p. 63) says that claims 1, 3 and 4 of the Stone application as originally filed claimed "pro-

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\*Italics ours throughout

ducing the same wave length or frequency in both circuits", i.e., the open antenna circuit and the closed circuit. But that is not so, as apparent upon reading the claims (not quoted in defendant's brief), claim 1, for example, being "The method of developing simple harmonic electromagnetic waves of a definite periodicity, which consists in producing *forced* simple harmonic electric vibrations of the same periodicity in an elevated conductor" (Stone application history, 5 R. 3708), which means producing by force—not by tuning (resonance)—in an antenna the desired currents. Stone knew perfectly the difference between tuned and untuned circuits, and how to describe them. He did not say anywhere in his original application, including the claims, that his antenna was tuned.

Defendant argues that the Stone amendments in 1902 to the effect that the antenna might be tuned must have had a foundation in the original application, because otherwise the Patent Office examiner would have refused them and there is "the presumption that public officers have properly performed their duties" (deft's. brief, p. 64). But the Patent Office has frequently erred in allowing amendments to applications, *Schriber Co. v. Cleveland Trust*, 305 U. S. 47, 56, 57 and cases cited; and defendant relies too strongly upon the presumption that the patent office examiners "properly performed their duties", in view of defendant's attacks upon the grant of the Marconi patent over the prior art urged now by defendant (deft's. brief, pp. 73, 76).

The amendment of the Stone application to add the new feature of antenna tuning was much like the amendment of a Fessenden application "to include the tuning of the closed circuit", *National El. Co. v. Telefunken Wire-*

*less*, 209 Fed. (D. C., S. D., N. Y.) 856, 864, per Judge Learned Hand, who, incidentally points out (p. 864):

"in patent causes we are chary of too ready an assumption of the obvious. Everyone concedes that Stone is a very expert person and one of the best men in the art, yet it was not so obvious but that he put an untuned condenser across a coherer in a local circuit".

This was the same Stone, and the entire opinion, filed in 1913, shows how little was known even then concerning the mysteries of wireless.

Turning back to the present case, the Stone letters in evidence (5 R. 3630, 3634), which were written before he applied for a patent on his system, do not contain anything material which he did not put in his patent application, as might be reasonably expected. Stone wanted a single frequency, and he proposed to accomplish this by tuning a single circuit and impressing its currents upon an untuned antenna (plff's. main brief, pp. 35, 36).

Defendant's brief (pp. 71, 72) states that the Stone Telegraph & Telephone Company, organized in December 1901, built and operated some wireless stations and apparatus having tuned open and closed circuits. But all these were in 1902 or later (Stone, 1 R. 762, 772) and, of course, all after Marconi filed his patent application in November 1900, and after the Marconi British patent had been published in May 1901.

Defendant asserts (brief, p. 73 *et seq.*) that "Marconi's 'variable inductance' in the antenna circuit cannot save his patent" which infers, erroneously, that plaintiff so contends. But the Marconi invention was not the use of a variable inductance, nor indeed any other specific way of

tuning an antenna—before Marconi it was known that electrical circuits could be tuned or not tuned, by inductance coils or condensers. His broad invention was the combination of a tuned antenna circuit and a tuned closed circuit. Some of the claims in suit are limited to a variable inductance but others are not.

Claims 1, 2, 3, 8, 12, 13, 18 and 19 specify "a variable inductance"; claim 11 "an inductance"; claims 6, 14, 16, 17 and 20 call for "means" for tuning; and claim 10 for resonant circuits. It is very plain that Marconi, and the Patent Office, did not think that the Marconi invention consisted in only tuning by a variable inductance.

Defendant's brief (p. 78 *et seq.*) comments upon the prior decisions sustaining the Marconi patent: *Marconi v. British Radio etc. Co.*, 27 T. L. R. 274, 28 R. P. C. 18, 4 R. 2525; *Marconi v. National*, 213 Fed. 815; and *Marconi v. Kilbourne & Clark*, 239 Fed. 328, affirmed 265 Fed. 644; but omits mention of the French decision, 4 R. 2622. We think these carefully considered decisions in bitterly contested litigations, in the early days of wireless, when contributions to the practical art perhaps could be more readily appraised at their just value than after the art has fully developed, and paths once discovered seem obvious, speak for themselves.

Marconi made a real invention, he changed wireless operations from experimental signalling for a few miles to regular commercial operation over more than 6,000 miles (*Marconi*, 1 R. 532; *Marconi v. National*, 213 Fed. 848); it was recognized by all the courts considering it as a great practical contribution (plff's. main brief, p. 22); it was used almost exclusively during the period covered by the accounting; and his patent was valid.

## **B. The Marconi claims were infringed.**

Defendant's brief (p. 84 *et seq.*) considers the question of infringement by its transmitters and receivers.

### **1. DEFENDANT'S TRANSMITTERS.**

Defendant's transmitters were of the plain gap type, rotary gap type and quenched gap type, as stated in plaintiff's main brief (pp. 39-44), where it is pointed out that the Court of Claims considered that they all infringed the Marconi claims and would have so found if it had upheld the claims, and the reasons for this conclusion are stated, including defendant's admissions to such effect. Defendant's answering brief does not question any of these statements.

Defendant says that the prior decisions show that its transmitters do not infringe (brief, pp. 79, 80, 87), which it is impossible for us to understand, because the British decision found that a plain gap transmitter infringed (4 R. 2525); in the *National* case the plain gap, the rotary gap and the quenched gap were all found to infringe (plff's. main brief, pp. 28-a, 42), notwithstanding which defendant's brief (p. 79) asserts that in this suit "The apparatus alleged to infringe consisted of a plain gap"; and, in the *Kilbourne & Clark* case, defendant's transmitters were not adjudicated, being expressly excluded from the case, and later found by the Interdepartmental Radio Board to be different from the adjudicated infringements in the *Kilbourne & Clark* case, the Board saying that in defendant's quenched gap transmitters "undoubtedly, advantage is taken of syntony [tuning] to secure an effective transfer of energy" (plff's. main brief, p. 43).

Infringement depends upon whether the circuits are tuned—not upon the kind of gap used. The invention, as expressed in the claims, relates to tuned circuits and not to spark gaps. The Court of Claims correctly found that the claims “in no way limit the patent monopoly expressed in them to any specific spark producer” (1 R. 43).

Defendant’s brief asserts that its spark gap circuits were not in “tune with the antenna circuit” (p. 90), there was “non-resonance” (p. 91), “detuning” (pp. 94, 95), “intentionally detuned” (p. 97). But the Court of Claims found as a fact that defendant’s plain gap circuits were “in tune or electrical resonance with each other” (1 R. 42); in the quenched gap transmitter there was “tuning of the closed and open circuits to resonance (1 R. 43); and in the rotary gap transmitters “the same condition of resonance between the open and closed circuits exists”, as in the plain gap (1 R. 45), the opinion being to the same effect (1 R. 101). These findings were supported by the evidence, as stated in plaintiff’s main brief (pp. 40-44).

## 2. DEFENDANT’S RECEIVERS.

Defendant’s receivers also infringe the claims if they are valid. The Court of Claims in its findings (1 R. 41-45) refers to typical receivers having tuned antennas and tuned closed circuits associated with a detector (“wave responsive device”), and defendant’s brief (p. 101 *et seq.*) does not seriously question infringement if the claims were valid over the prior patents to Marconi 627,650 and “Tesla, Stone and others” (def’t’s brief, p. 102, footnote).

The broad claims in suit of the Marconi patent, 763,772, claims 1, 2, 3, 6, 8, 10 through 14, 17 through 20, were

valid and the Court of Claims erred in deciding otherwise, and the claims were infringed by defendant's apparatus as stated by that court.

## **II. Claim 16 of the Marconi patent.**

The Court of Claims sustained claim 16 of the Marconi patent as valid and infringed, defendant successfully petitioned this Court for a writ of certiorari and the matter is before this Court in case No. 373.

Defendant's brief (pp. 6-8) in this case contends that the Court of Claims erred in deciding that claim 16 of Marconi patent No. 763,772 was valid and infringed, and in deciding that the value of the invention to the defendant should be based on its usefulness in defendant's apparatus.

There were two trials before the Court of Claims. The first, by stipulation of the parties (1 R. 74-75) under a Rule of that Court, was for the purpose of *determining* the issues of validity and infringement of the various patents in suit. The second was for the purpose of ascertaining reasonable compensation for infringement. This is common practice in patent and other cases involving accountings.

On the first trial, the parties thoroughly litigated the issues of validity and infringement of the various claims in suit of the four patents upon which the action was brought. The evidence was submitted to a Commissioner who made his report, and the case was argued before the Court of Claims, which decided that some claims only were valid and infringed, and ordered an accounting as to them. The decision was not satisfactory to plaintiff with respect to broad claims of the Marconi patent and the Fleming patent, nor to defendant as to claim 16 of the Marconi



patent. But neither party moved for rehearing, reargument, nor, at any time, to reopen the decision on validity and infringement.

**A. The Court of Claims correctly found that claim 16 was valid and infringed.**

Defendant had full notice on the trial of the issues of validity and infringement that plaintiff was relying on claim 16, and both plaintiff and defendant offered evidence regarding its validity and infringement. Defendant had its day (*i.e.*, years) in court.

In plaintiff's opening case, the operation of claim 16 was explained, the claim being quoted (Waterman, 1 R. 356-7, 361, 365), and it was also testified that various receivers of defendant used the condenser of the claim, for tuning the antenna circuit (Waterman, 1 R. 389, 390, 447). Thereafter, defendant put in its case, Loftin, its expert witness, testifying at length concerning the claims in suit, including claim 16, of the Marconi patent with respect to their meaning, validity, and infringement (2 R. 873-1060; infringement of the claims, 985-1060), but without contradicting any of the aforesaid cited testimony on behalf of the plaintiff.

The report of the Commissioner was that claim 16 was valid and infringed, to which defendant excepted, and defendant argued those two issues, and others, before the Court of Claims. Defendant does not contend that these issues were not argued by it before that court (they were, *deft's*, brief there, validity, pp. 4126 *et seq.*, infringement, pp. 4135 *et seq.*).

The Pupin and Fessenden patents, upon which defendant now argues invalidity and noninfringement (*deft's*,

brief, pp. 26-31), were before the court on the first trial. Defendant apparently did not then consider them to be so important as it does now, because it did not urge that they showed either noninfringement or invalidity of claim 16 (or any other claim).

The court found (1 R. 57) that claim 16 was "directed to a combination of elements which is new and useful" and that some tables in the Marconi patent "indicate that the purpose of the condenser connected in shunt with the primary winding of the transformer of the receiver, is to enable the electrical periodicity or tuning of the open circuit of the receiver to be altered", and that certain specified receivers of defendant "each has apparatus coming within the terminology of claim 16" (1 R. 60); and as a conclusion of law, that claim 16 was valid and infringed by the specified receivers "and any other apparatus used by defendant coming within its terminology" (1 R. 75).

This decision that claim 16 was valid and infringed, including the finding that in the Marconi patent the shunt condenser tuned the antenna circuit, was based upon undisputed evidence to such effect. Defendant points to no evidence on the first trial to the contrary.

**B. In view of the stipulation, as well as under orderly trial procedure, the Court of Claims rightly decided that defendant was precluded from relying on evidence, taken after the interlocutory decision, to show invalidity or non-infringement.**

In view of the stipulation, as well as under usual procedure, the issues of validity and infringement of claim 16 were determined by the interlocutory decision of the

court below. Defendant made no motion for new trial (i.e., "to question the correctness or sufficiency of the court's conclusions on its findings of fact or to amend the same", Court of Claims Rule 91) nor otherwise sought to reopen the case on those issues. It accepted the interlocutory decision as final, subject only to review by this Court on the evidence that was then before the Court of Claims.

On proceedings under the interlocutory decision, evidence was taken before a Commissioner to determine the amount of compensation due plaintiff. No evidence was offered by defendant for the purpose of showing that the prior decision on validity or infringement was erroneous (undoubtedly the Commissioner would have rejected any such). Certain testimony regarding the Pupin and Fessenden patents was offered and received, on the expressed understanding that it did not relate to validity (3 R. 2376, 2377, 2381). On the accounting, there was and could be no issue as to validity, and no issue as to infringement by what had been adjudicated to infringe claim 16.

However, on the hearing before the Court of Claims on the question of the amount of damages defendant attempted to raise and reargue the issue of infringement, the Court declined to reconsider the issue (1 R. 175). The question is not whether the Court of Claims had the power to change its former decision (as defendant's brief, pp. 38-39, seems to argue). Of course, a court clearly has the power on a subsequent proceeding to reopen its prior decision, and then decide differently, *Messinger v. Anderson*, 225 U. S. 436, 444; *Simmons Co. v. Grier Co.*, 258 U. S. 82. But that is not the situation here, because not only did the Court not exercise such power but defendant did

not even so request, as the Court of Claims pointed out (1 R. 175, 177).

**C. Even if the accounting evidence be considered, it does not establish non-infringement or invalidity.**

Defendant now contends, based on some evidence taken on the accounting, that the shunt condenser of Marconi claim 16 does not tune the antenna circuit, being used merely to loosen the coupling between the antenna circuit and the closed circuit (brief, pp. 17-21). Upon this assumption, defendant argues that the claim is not infringed, because defendant's receivers do use the condenser to tune the antenna circuit (as plaintiff established, *Waterman*, 1 R. 389 *et seq.*), defendant also saying that the damages awarded by the court were wrong because they were based on the tuning utility of the condenser in defendant's apparatus, and not on the coupling advantage alleged to be shown in the Marconi patent.

Thus, the underlying question is whether in Fig. 2 of the Marconi patent the condenser *h* tunes the antenna circuit. Defendant now asserts that it does not, relying upon some accounting evidence. Plaintiff asserts that it does, relying upon the undisputed evidence on the trial of the issues of validity and infringement, and also pointing out that the accounting evidence, if competent, does not contradict, but on the contrary, supports this conclusion.

At the first trial, in plaintiff's opening case, it was testified that the condenser tuned the antenna circuit (*Waterman*, 1 R. 357). In defendant's lengthy answering testimony on the Marconi patent, including claim 16 and other claims, their validity and infringement by defend-

ant's apparatus (Loftin, 2 R. 837-1060), not only was there no contradiction of this, but defendant's expert witness Loftin expressly stated that the Marconi receiving antenna was tunable by the shunt condenser *h*, not only by inductance (2 R. 876), saying in connection with claim 16 that its shunt condenser "is merely one of numerous ways for obtaining an adjustment of the product of capacity and inductance of a circuit, *in this case the adjustment being obtainable through varying the capacity*" (1 R. 920); and that the condenser was "an arrangement rarely used in tuning the antenna or open circuit through varying the effect of the coil of the winding which it shunts" (2 R. 977). Neither Loftin nor any other witness for defendant questioned the prior evidence in the record that this condenser was used in defendant's apparatus as had been previously shown in plaintiff's *prima facie* case.

Upon this evidence, the Court of Claims found that claim 16 was valid and infringed, and also that the condenser tuned the antenna (open) circuit, saying that the condenser was "to enable the electrical periodicity or tuning of the open circuit of the receiver to be altered" (*supra*, (p. 14).

Turning now to the evidence on the accounting, where defendant's witnesses sought to minimize, but did not deny, the tuning effect of the condenser.

Referring to the condenser in the Marconi patent, defendant's witness Dow testified on the accounting:

"XQ.557. What is it in the antenna circuit that is *tuned* to the received wavelength?

"A. The antenna *f*, the coil *g'*, the *condenser h*, and the earth capacity *e*" (3 R. 2400).

"XQ. 596. Now, if the *condenser h*, in figure 2 of the patent, is variable, then is it not correct to say that a variation of the capacity of that condenser enables the electrical periodicity of tuning of the open circuit of the receiver to be altered?"

"A. That is correct" (3 R. 2402).

"A. That the antenna has some effect on the resonance frequency; but that it is principally determined by the value of the *condenser h* and the coil *j*" (3 R. 2404).

Wheeler, another witness for defendant, said that the condenser *h* could be used to bring the receiver into tune with the transmitter (3 R. 2460, 2461, XQs. 212-4, 219), and, "The value of adjustment for condenser *h* is to adjust it to the exact value of the received wave-length, which may not be exactly .0046" (3 R. 2463, XQ. 239).

Pickard, a witness for plaintiff, also testified in the accounting proceedings to the same effect, pointing out the various tuning advantages of the condenser in the Marconi patent (3 R. 2330-2337).

And it is plain that a variable condenser, such as *h*, must vary the capacity of the circuit in which it is connected, because that capacity includes the capacity of the condenser.

With respect to the validity of claim 16, defendant contends (p. 24 *et seq.*) that if its receivers infringe, the claim is invalid because of prior art. But this was an issue pertaining to validity and infringement which was litigated in the trial to determine validity and infringement (and was then raised by defendant. "All of the claims read quite as easily upon the prior art receivers \* \* \* as they do upon the defendant's receivers", deft.'s Court of Claims brief, p. 4135). However, the argument then was based upon prior

art patents other than Pupin 640,516 and Fessenden 706,735.

Defendant seeks at several places (by references to testimony on the first trial, by stating that the basic evidence was introduced at the first hearing, brief p. 32, etc.) to make it appear that the accounting evidence is not necessary to its present position. But none of the evidence on the first trial supports or was even intended to support defendant's present argument. Likewise, defendant misrepresents the stipulation, saying (brief, pp. 33-34) that "The parties had stipulated that the first hearing be limited to the issues of validity and infringement", whereas the stipulation was expressly that the issue of reasonable compensation be postponed until the *determination* of the issues of validity and infringement (1 R. 74-75).

If defendant had moved to reopen the case with respect to validity and infringement, to offer additional evidence concerning the Pupin and Fessenden patents, and the motion had been granted, with leave to plaintiff also to offer evidence on these issues, plaintiff would have pointed out, among other things, that claim 16 of Marconi is for a wireless receiving system containing an antenna circuit tuned by a variable shunt condenser, and a tuned transformer-coupled closed circuit with a detector; that the Pupin patent describes a wire telegraph system having no antenna or open circuit or equivalent, and no elevated wire or antenna-earth capacity, and has condensers which are not varied in operation to receive different wave lengths, as in Marconi; that the application for the Fessenden patent (only the application was prior to Marconi) discloses a wireless receiving antenna circuit containing a shunt condenser not used for tuning, and no coupled circuit; and other matters per-

tinent to the issues of validity and infringement. However, as these issues were not open on the accounting proceeding, plaintiff properly made no real effort to meet the evidence upon which defendant now relies to show invalidity and noninfringement.

The Pupin and Fessenden patents were much relied upon as defenses in the *National* case, the opinion there discussing them, particularly Fessenden, 213 Fed. 850 *et seq.*, 860, and holding claim 16 and other claims valid and infringed. Moreover, Fessenden, like Stone, had no thought of tuning until after he had become acquainted with Marconi's invention, after which he amended his application to describe tuning (*United Wireless Co. v. National Elec. Sig. Co.*, 198 Fed. 386; *National Elec. Sig. Co. v. Telefunken*, 209 Fed. 856; *aff'd* 221 Fed. 629). In the present case, claim 16 was correctly held valid and infringed, as pointed out in plaintiff's main brief (p. 47).

To conclude, defendant had its day in court and a fair trial on the issues of validity and infringement, the decision of the Court of Claims on claim 16 was supported by the uncontradicted evidence, that decision became the law of the case and binding upon defendant so far as that court was concerned in the absence of a motion to set it aside, and the court rightly refused to consider accounting evidence on the issues of validity and infringement. And, as the Marconi patent had the tuning advantages of the shunt condenser, admittedly in defendant's receivers, the court rightly took such advantages into consideration in ascertaining the damages.

The decision below as to claim 16 of the Marconi patent should be affirmed. In any event, it should not be re-



versed without giving plaintiff an opportunity to meet the evidence which defendant took on the accounting, ostensibly on questions of amount of damages, if such evidence is to be used on the issues of validity and infringement.

### **III. Fleming patent 803,684.**

The Fleming patent is in Case No. 369, upon plaintiff's petition. The Court of Claims found that the claims in suit of the Fleming patent 803,684, claims 1 and 37, were not infringed (findings, 1 R. 72, 117), and said that the claims were invalid because of delay in filing a disclaimer (opinion, 1 R. 106, 107). Defendant's position is that the court below was right on these points, and also that the Fleming patent was invalid because of the prior art and because the subject matter of the disclaimer was improper (deft's. brief, p. 102 *et seq.*).

#### **A. The claims were valid.**

Defendant relies for its defense of invalidity upon Edison patent 307,031, some laboratory experiments of Fleming, followed by others, with incandescent lamps, some Wehnelt experiments with oxide coated cathodes in tubes, and a Valbreuze French patent.

##### **1. EDISON PATENT 307,031.**

Edison patent 307,031 (4 R. 3295) issued October 21, 1884. It discloses an ordinary incandescent lamp, having a filament heated to glowing incandescence by a direct current, with the addition of a plate inside the lamp. Edison observed that there was a direct current in the external circuit connecting the filament to the plate, and

that the amount of the current was in proportion to the degree of incandescence of the filament. He proposed to use the filament-plate current to indicate or regulate variations in the lighting current in the system, by means of a galvanometer.

Defendant's brief repeatedly refers to this lamp as "the Edison tube" (brief, pp. 7, 113, 116, 117, 118, etc., etc.) presumably to make it seem like a radio tube, but it was nothing but an incandescent lamp with an external circuit to indicate variations in the lighting current, which was never used (Waterman, 1 R. 21), and never meant anything to anyone in connection with wireless, including Edison, who was a worker in many electrical fields, including wireless (Edison 1891 wireless patent, 465,971, 1 R. 21).

Defendant also refers to this lamp as "Edison's two-electrode rectifier" (brief, p. 103), although it was merely a variety of lamp with a circuit for indicating variations in the lighting current, his patent containing nothing with respect to rectification (the change of alternating currents to a direct current), and not even mentioning alternating currents.

The Edison patent does not explain why there was a current in the external circuit, there is no evidence that Edison himself knew why there was, and defendant's expert (Miller, 1 R. 679) admitted that at the time of the Edison patent "the mechanism underlying Edison's discovery was completely unknown and the phenomenon was mystifying".

About twenty years elapsed before Fleming discovered that a hot cathode-cold anode tube had any usefulness in wireless or in connection with electro-magnetic waves, notwithstanding the many eminent scientists who studied and

wrote papers on the mysterious "Edison effect" (def't's exhibits I-1, J-1, K-1; 4 R. 3413-3448 and L-1, M-1, N-1; 5 R. 3449-3514, including discussions by many scientists).

Defendant's brief (p. 112) asserts that "Structurally, the Fleming tube and its circuit as defined in the claims in suit are identical with those disclosed by Edison", that "Fleming's claim 1 is patterned after the cited Edison claim 5", and that "plaintiff does not seriously dispute that features of the Fleming patent cannot be treated as his discovery". Plaintiff does so dispute, seriously, and the obvious differences between the Edison lamp patent and the Fleming patent are apparent from Edison claim 5 and Fleming claims 1 and 37, especially when read in the light of the specifications, as claims should be read. The same rules of interpretation apply to patents, written contracts between the patentee and the government, as apply to other contracts, which are to be read as a whole.

*Claims are read in the light of the patent description.*

"The claims of a patent are always to be read or interpreted in the light of its specification", *Schriber Co. v. Cleveland Trust Co.*, 311 U. S. 211, 217; *Carnegie Steel v. Cambria Iron*, 185 U. S. 403, 432; *Fruit Growers v. Brogden*, 283 U. S. 1, 6; *Tilghman v. Proctor*, 102 U. S. 707, 730. In *Consolidated Roller Mill v. Walker*, 138 U. S. 124, 132, the following statement was approved, viz.: "To understand the nature of the invention intended to be covered by the first claim, resort must be had to the specification".

Turning now to the claims, Edison claim 5 is:

"5. The combination, with an incandescent electric lamp of a circuit having one terminal in the vacuum space within the globe of said lamp, and the

other connected with one side of the *lamp-circuit*, and electrically controlled or operated apparatus in said circuit, *substantially as set forth*".

What this means is "set forth" in the specification of the patent, from which it appears that Edison had the ordinary "incandescent lamp", whose filament was heated by a direct current, and a circuit between the filament and a plate inside the lamp, to indicate variations of current in the lamp circuit.

The Fleming claim 1 as originally filed and claim 37 are:

"1. The combination of a vacuum vessel, two conductors adjacent to but not touching each other in the vessel, means for heating one of the conductors, and a circuit outside the vessel connecting the two conductors."

"37. At a receiving-station in a system of *wireless telegraphy* employing electrical oscillations of high frequency a *detector* comprising a vacuum vessel, two conductors adjacent to but not touching each other in the vessel, means for heating one of the conductors, a circuit outside of the vessel connecting the two conductors, means for detecting a continuous current in the circuit, and means for impressing upon the circuit the received oscillations."

It is plain that the Edison and Fleming claims are substantially different, that the Fleming claims are based upon the disclosure of his patent, including the use of "conductors", explained in the patent as employed for conducting a unidirectional current between them, obtained from alternating currents impressed upon an external circuit containing them, and that they do not cover the Edison lamp.

## 2. FLEMING'S EXPERIMENTS WITH INCANDESCENT LAMPS.

Fleming experimented with the Edison lamp and observed that if the filament was heated to incandescence by an alternating current, instead of the direct current used by Edison, there would be current in the external circuit in only one direction, *i.e.*, from the heated filament (Fleming 1890 paper, 5 R. 3416, 3511); and later others verified Fleming's discovery (Howell 1897 paper, 5 R. 3450, and see pliff's. main brief, p. 64).

In none of these experiments was there any application to the tube of alternating currents from a circuit other than a tube circuit, and, of course, no application of signal carrying currents to be detected.

## 3. THE WEHNELT EXPERIMENTS.

In October 1904, the *Physikalische Zeitschrift*, a German scientific paper, was published, containing an article by Wehnelt (translation, 5 R. 3515), on some experiments on certain special types of tubes which contained cathodes having oxid coatings.

In the experiment of Fig. 1 (deft's. brief, p. 119), a direct current battery B is connected between the cathode and the anode, first in one direction and then in another, Wehnelt observing that "The experiment shows consequently that only negative ions are emitted from the incandescing oxid" (5 R. 3516).

In the experiment of Fig. 4 (deft's. brief, p. 120), an anode is pushed "close to the glowing metallic oxid" cathode, the "discharge potential" is about 20 volts when the cathode and anode are connected one way, and in the other way "some thousands of volts, since under deep pressures the cathode drop on metals takes on exceedingly high

values". Discharge potential does not mean current, because current is potential (voltage, electrical pressure) divided by resistance, and Wehnelt does not give the resistance. Wehnelt concludes that "If, therefore, we connect the electrodes A and K with an alternating source of current, *the potential of which lies below the value which the cathode drop on the metallic cathode A has*", the tube "can consequently serve for the purpose of transforming alternating current into pulsating direct currents" (5 R. 3517).

At most, the Wehnelt laboratory experiments showed that, under certain special conditions, an oxide coated cathode might be used in a tube to rectify alternating currents applied to the tube. There was no suggestion that these observations could be applied to and developed into anything useful in wireless telegraphy.

#### 4. VALBREUZE FRENCH PATENT 328,687.

The Valbreuze French patent 328,687 (translation, 5 R. 3547) is much relied upon by defendant (brief, p. 123 *et seq.*), which repeatedly refers to the tube of the patent as "a two-electrode tube" (brief, pp. 123 *et seq.*), thus confusing it with what the radio art commonly refers to as such a tube, namely, the hot cathode-cold anode type of the Fleming patent.

The Valbreuze patent proposes to use as a detector of high frequency currents a tube which does *not* have a heated electrode, but instead is to rectify by "a point and ball very close together" (Valbreuze patent translation, 5 R. 3550), what defendant's expert called "the well-known sphere and point rectifier" (Miller, 1 R. 682).

Defendant contends that Valbreuze has an electrode heated to emit electrons, like the Fleming patent (brief, p.

126, 128, 166, etc.), declaring that the point would be heated, by ionic bombardment, etc., so that it would emit enough electrons to operate. The record does not warrant such theorizing. The patent does not say that an electrode is heated. Defendant's expert witness who testified concerning the Valbreuze patent did not claim that it had a heated electrode (Miller, 1 R. 682); plaintiff's witnesses testified that it did not have a heated electrode, and also that the Valbreuze idea was a useless thing (Weagant, 3 R. 1765; Waterman, 3 R. 2027); this was not contradicted by defendant's witnesses although Miller again testified concerning the Valbreuze patent (3 R. 2149); and the Court of Claims found that the patent "did not have a vacuum tube with heated filament but did propose a vacuum tube with two cold electrodes for use with radio frequencies as a rectifier" (findings, 1 R. 65).

Incidentally, defendant's footnote to page 131 of its brief that "Fleming himself, in his patent, acknowledged that when strong Hertzian waves are received, their alternating current will itself be sufficient to heat the filament to incandescence" is erroneous. It is true that the patent says that the filament may be incandesced by sufficiently strong "high-frequency or low-frequency alternating currents of electrical oscillations" (pat., p. 2, l. 99), but it does not say that the ordinary ether (Hertzian) waves are sufficiently strong for such operation (and they would not be).

The Valbreuze patent was applied for and issued in 1903, by a scientist who was familiar with vacuum tubes and wireless, as appears from his patent, and who undoubtedly knew of the "Edison effect" and perhaps many of the learned papers and discussions on it after the Edison patent was published in 1881. The fact that Valbreuze proposed

to employ the highly inefficient and practically useless point and ball type of rectifier, instead of the hot cathode-cold anode Fleming type, is strongly convincing that the "Edison effect" did not teach the Fleming invention.

##### 5. THE FLEMING PATENT WAS VALID OVER THE PRIOR ART.

What Fleming did was patentable invention, whether tested by the "flash of creative genius" standard, *Cuno Engineering v. Automatic Devices*, 31<sup>st</sup> U. S. 84, 91, or the standard applied in *Williams Mfg. Co. v. United Shoe Mach. Co.*, 316 U. S. 364. He discovered that a vacuum tube containing a heated cathode and a cold anode, to the external circuit of which incoming alternating high frequency currents were applied, would rectify those currents and would "detect" the signals carried by those currents. This was new, useful, a discovery of great merit, the foundation of modern radio tubes, and worthy of the patents which were granted him here and in Great Britain.

The Fleming diode, two-electrode hot cathode tube, was widely used as a detector from 1907 to 1915, and relied upon for vitally important communication between ship and shore, being superseded about 1915 by the triode which differed only by the addition of a grid and associated battery, for amplification (plff's brief, pp. 59-60). But Fleming's diode detector is in wide use today in radio broadcast receivers, in the form considered by this Court in *Detroit v. Hazeltine*, 313 U. S. 259, in which suit the Sixth Circuit Court of Appeals stated that "The patented device is used today in all well-known radio receivers manufactured in the United States", 117 F. 2d. 239, 240. Fleming made a real contribution to the practical radio art.



**IV. The disclaimer was filed in time and its subject matter was proper.**

**A. The disclaimer was filed in time.**

The Court of Claims said in its opinion that the patent was invalid because the disclaimer was filed too late (1 R. 106, 107) but did not make any finding on this point. The court referred (1 R. 106) to an 1890 observation of Fleming "that the current flowed only in one direction when an alternating current was used in connection with the lamp of an Edison apparatus" and "1897 similar statements made by Howell and Kennelly", and also to Fleming's statement in his patent that "I have discovered that if two conductors are inclosed in a vessel \* \* \* the space between the hot and cold conductors possesses a unilateral electric conductivity, and negative electricity can pass from the hot conductor to the cold conductor, but not in the reverse direction" (pat., p. 1, l. 53 *et seq.*). The court erroneously thought that Fleming was "stating this feature in his patent specifications as new and patentable" (opinion, 1 R. 106), and that it was this discovery by Fleming which was disclaimed. Not at all; the disclaimer was with respect to frequencies other than high frequencies.

Claim 1 as issued was:

"The combination of a vacuum vessel, two conductors adjacent to but not touching each other in the vessel, means for heating one of the conductors, and a circuit outside the vessel connecting the two conductors."

This circuit was the one to which were applied alternating currents from an external source, which currents the

specification of the patent said might be either of low frequency or high frequency. The disclaimer limited the claim to "high frequency alternating electric currents or electric oscillations of the order employed in Hertzian wave transmission".

The 1890 Fleming paper did not invalidate claim 1 as originally filed, because Fleming did not apply external alternating currents to "a circuit connecting the two conductors", but merely heated his filament by an alternating current instead of a direct current (Fleming paper, 4 R. 3415). The 1897 Howell paper (5 R. 3459) containing some remarks by Kennelly (5 R. 3464) discussed the Fleming experiments.

Defendant's brief (p. 137-8) says that the disclaimer is invalid, because "Fleming had full knowledge of Edison's work before he filed his patent application" and the Fleming "claim 1 was patterned closely upon Edison's claim 5, covering Edison's device without change". This is essentially the same contention as above discussed (*supra*, p. 23), where the differences between Edison and Fleming are pointed out.

We think that claim 1 without the disclaimer was valid, because there was nothing in the prior art teaching the use of a hot cathode-cold anode vacuum tube, producing a one-way electron stream inside the tube from alternating currents applied to an external circuit including the cathode. However, the test is not whether the claim would or would not have been sustained, but whether there was unreasonable delay after the patentee became "aware that he has claimed more than he has invented or described" and until then "the allowance of his claim by the Patent Office raises such a presumption in its favor that he may rely on its

validity until a court of competent jurisdiction decides that it is broader than his real invention", *Ensten v. Simon Ascher*, 282 U. S. 445, 453. In the present case, it is plain that Fleming did not consider that the "Edison effect" or his 1890 experiments on it were more than observations from which his discovery and invention resulted, as appears from his 1905 paper where he states that he had recently returned to his 1890 observations and "it seemed quite possible that such a device would provide us with a means of rectifying electric oscillations and making them measurable on an ordinary galvanometer" (5 R. 3141). There is nothing in the record to justify the Court of Claim's view that Fleming must have known, when taking out his patent, that his 1890 experiments invalidated claim 1 (opinion, 1 R. 106). It is at least as probable that the Wehnelt German article, cited against the Fleming patent in the *Marconi v. De Forest* litigation, caused the disclaimer, it being plain common sense to avoid unnecessary argument, by limiting the claim to the particular subject matter of the *Marconi v. De Forest* suit, namely, the radio tubes used by defendant, which were used in connection with high frequency current (plff's. main brief, p. 73).

**B. The subject matter of the disclaimer was proper.**

Defendant's brief (p. 138 *et seq.*), asserts that the form of the disclaimer is improper and, therefore, that the disclaimer is invalid. This contention is unsound, and the Court of Claims did not so find or state.

This Court has often considered the form of disclaimers, sustaining some and invalidating others. The controlling principle of the decisions has been that a disclaimer narrowing the disclosed invention, as by limiting a claim to a

specific type of its general class or by deletion of unnecessary parts, is valid, but that a disclaimer which broadens the patent, or which changes the claimed combination, as by adding a new element, is invalid.

Disclaimers were sustained in *Silsby, et al. v. Foote*, 61 U. S. 378, the disclaimer limiting a broad claim for automatic stove opening mechanism to heat regulation; *Dunbar v. Myers*, 94 U. S. 187, disclaiming a single plate apparatus and claiming only a two plate apparatus (p. 192-194); *Hurlbut v. Schillinger*, 130 U. S. 456, limiting a process of forming blocks to the use of tar paper or its equivalent (p. 465); *Carnegie Steel v. Cambria*, 185 U. S. 403, 405, etc. Many other similar decisions are discussed in *Electrical Accumulator v. Julien Electric Co.*, 38 Fed. (C. C. S. D., N. Y.) 117, 134, *et seq.*

*Altoona Publix v. American Tri-Ergon*, 294 U. S. 477, considered the question of the form of disclaimers, incidentally referring to the disclaimer now before this Court. In the *Altoona* case, the disclaimer was held invalid, because it added a new element to the claim, namely, a fly wheel (pp. 490, 491). But this Court did not hold or intimate that a limiting disclaimer was improper, observing in the footnote to page 490 that disclaimers had been upheld

"where the elimination from the patent of the matter not relied upon did not operate to enlarge the monopoly of the patent, but narrowed it . . . by limitation of a claim or specification by deletion of unnecessary parts, *Carnegie Steel Co. v. Cambria Iron Co.*, 185 U. S. 403, 435, 436; *Marconi Wireless Telegraph Co. v. DeForest Radio Telephone & Telegraph Co.*, 243 Fed. 560, 565 (C. C. A. 2nd), or by limiting the claim to a specific type of the general class to which it was applied, *Minerals Separation, Ltd. v.*

*Butte & Superior Mining Co.*, 250 U. S. 336, 354;  
*United Chromium Inc. v. International Silver Co.*,  
 60 F. (2d) 913, 914 (C. C. A. 2d); *Seiberling v.*  
*Thropp's Sons Co.*, 284 Fed. 746, 756, 757 (C. C.  
 A. 3rd)";

The *Marconi v. De Forest* case above cited sustained at the page referred to (565) the disclaimer here under consideration.

In *Milcor v. Fuller*, 316 U. S. 143, the courts below invalidated certain claims because disclaimers added new elements to the claims, and this Court affirmed. One disclaimer added a particular kind of flange to one claim, and the other disclaimer added a particular kind of a strip to another claim, this Court saying (p. 146) "the revised patent includes new elements which were not present in the original".

The disclaimers were there held improper because they did "more than delete a 'distinct and separable matter . . . without mutilating or changing what is left standing' ". The Fleming disclaimer, on the other hand, merely deletes a separable matter (use with low frequencies), without changing what is left (use with high frequencies).

Thus the disclaimer in the present case is like those referred to in the above quotation from the *Altoona* opinion (and, indeed, is one of them), and in the *Silsby*, *Dunbar* and *Hurlbut* decisions. It specifically limited broad claims for certain electrical apparatus to use "in connection with high frequency alternating currents or electrical oscillations of the order employed in Hertzian wave transmission" (disclaimer). These claims originally might have been argued to have to read upon some earlier work, and therefore been held invalid. The invention that Fleming made was to transform a laboratory experiment of scientific curiosity

and speculation into a practical device of the highest possible utility in the radio art, no one before Fleming knowing that a thing which produced unidirectional currents would rectify oscillations of the order used in radio communication, or that a thing which would rectify would detect, *i.e.*, act upon radio frequency currents carrying signal components so as to make the latter perceptible, *Marconi v. De Forest*, 2 Cir., 243 F. 560, 563, 564.

The Fleming patent plainly discloses that the invention is to be used in radio communication. The only apparatus shown in the drawings is radio apparatus, and the specification (pat. p. 1, l. 11, *et seq.*) states that the invention "relates to certain new and useful devices for converting alternating electric currents, and *especially* high-frequency alternating electric currents or electric oscillations" (pat. p. 1, l. 11, *et seq.*), "feeble electric oscillations, such as are employed in Hertzian-wave telegraphy" (*id.*, p. 1, l. 17), etc. Under such circumstances, it was proper to narrow the monopoly of the patent "by limitation of a claim or specification by deletion of unnecessary parts" or "by limiting the claim to a specific type of the general class to which it relates", *Altoona opinion, supra*.

Fleming made a real invention, which was clearly described in his specification. Limitation of specification and claims to that invention was proper, because "the disclaimer statute is remedial, and intended for the protection of both the patentee and the public", *Triplett v. Lowell*, 297 U. S. 638, 645; "The power to disclaim is a beneficial one, and ought not to be denied, except where it is resorted to for a fraudulent and deceptive purpose", *Sessions v. Romadka*, 145 U. S. 29, 40.

The form of the disclaimer was not improper.

## V. The Fleming claims were infringed.

Defendant's argument on the issue of infringement of the Fleming claims 1 and 37 in suit (deft's. brief, p. 141, *et seq.*) is not that the claims do not read upon defendant's tubes (except as to tubes used as audio frequency amplifiers, brief, p. 158\*), but it is, in essence that the De Forest improvement of a grid and a local battery avoids infringement. However, the real question is not whether defendant's tubes are better than the diode shown in the Fleming patent, but whether the Fleming invention is the foundation and basis of these tubes.

*Cochrane v. Decner*, 94 U. S. 730, 737:

"The defendants admit that the process has produced a revolution in the manufacture of flour; but they attribute that revolution to their improvements. It may be, as they say, that it is greatly due to these. But, it can not be seriously denied that Cochrane's invention lies at the bottom of these improvements, is involved in them, and was itself capable of beneficial use, and was put to such use. It had all the elements and circumstances necessary for sustaining the patent, and cannot be appropriated by the defendants, even though supplemented by and enveloped in the very important and material improvements of their own."

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\*Defendant's point here is that claims 1 and 37 are limited to use in connection with radio frequencies, claim 37 being also limited to "a detector", and defendant's tubes merely amplify audio frequencies after detection by an associated tube. But both claims are infringed, because the tubes are used in connection with radio frequencies, as they amplify the audio frequencies carried by the radio frequencies, and the tubes are part of a detector, which would not "detect" without them (plff's main brief, p. 67).

The Fleming invention consists of an evacuated tube, a hot electrode (cathode), a cold electrode (anode), and an electrical circuit so arranged that when high frequency alternating currents carrying signals are applied to the tube circuits there is produced a unidirectional current between the hot electrode and cold electrode, containing the signal in the form of pulsations. This is found in defendant's tubes, whether used to detect or to amplify (the latter including regenerative feed back and oscillations, plff's. main brief, p. 56), and defendant's tubes would not operate if their cathodes were not hot and the alternating currents applied to the tube were not rectified to produce a unidirectional current through the tube. This should decide the issue of infringement in favor of plaintiff.

Defendant's discussion of the functions and operations of the grid in its tubes (brief, p. ~~146~~<sup>147</sup>, *et seq.*) are irrelevant, because there is no question but that the grid was an improvement, plaintiff in the *Marconi v. De Forest* case agreeing that "De Forest in his three-electrode Audion has undoubtedly made a contribution of great value to the art", 236 Fed. 955 (Sept. 20, 1916).

The grid, whether the tube is used for detecting or amplifying, acts upon and utilizes *the Fleming uni-directional flow of electrons from heated cathode to anode inside the tube*. Such action is necessary in the operation.

When a triode tube is detecting, the grid, because of rectification of the radio frequency currents by the tube, accumulates on it the audio frequency variations, which are the signals, and are carried by the radio frequency currents. The Court of Claims so found (finding LXXV, 1 R. 69), and although it correctly says that after the rectification has charged the grid "rectification of the full



high radio-frequency waves ceases", it is obvious that rectification is necessary. The court appears to have been so impressed with the importance of the grid that it overlooked the fact that there must be a uni-directional rectifying current in order for the tube to operate. Defendant's brief (footnote, p. 16<sup>L</sup>) says with respect to its tube that "one of its most important characteristics is that it is uni-directional only", but it is more than that, it is essential. The grid impresses its audio frequency variations upon *the uni-directional electron stream from heated cathode to anode*, which is a part of the cathode-anode circuit, and the variations operate an indicator. In Fleming, the audio frequency variations of the incoming radio frequency currents themselves operate, in the cathode-anode circuit, an indicator, Fleming of course using both rectification and the same uni-directional stream.

When a triode tube is amplifying, the grid varies with all the variations of the incoming currents, and impresses all these variations upon *the uni-directional electron stream from heated cathode to anode*, the resulting variations in the cathode-anode circuit then operating any desired device, including a following tube. Fleming does not disclose any amplification.

If the Fleming invention was the contribution to the radio art of an invaluable tool, namely, a hot cathode-cold anode tube with uni-directional electron stream carrying radio frequency variations, as was held in *Marconi v. De Forest*, and we think rightly, defendant's tubes infringe, because they use that invention, which is necessary to any function performed by the grid.

In connection with the *Marconi v. De Forest* case, defendant's brief (p. 169, *et seq.*) repeats the error of the

Court of Claims that there was no issue of infringement in that case (1 R. 112), although that error was pointed out in plaintiff's main brief (pp. 68, 69). As this error undoubtedly influenced the court below, it is desirable to make perfectly clear that the question of whether the De Forest triode tubes infringed the Fleming patent was contested.

In the district court, 236 Fed. 942, the defendants argued vigorously that the De Forest triodes did not infringe the Fleming patent, the district court stating (p. 951):

"We now come to what I think is the only substantial question in the case—the infringement claimed against defendants."

Defendants alleged there, as defendant does here, that the addition of the grid and a local battery to the Fleming tube avoided infringement, and the operation of these things was much discussed (p. 952, *et seq.*).

In the circuit court of appeals, 243 Fed. 560, infringement again was contested, the court saying (p. 564), "it is upon the question of infringement that this record has been filled with theories", and again the action of the grid and local battery are considered, including their legal effect on the issue of infringement.

Defendant's brief (p. 171) quotes from the district court's opinion, 236 Fed. 953, "In reading this literature it must be remembered that both sides agree that the De Forest two-element and three-element bulbs operate *on the same principle*". By "same principle" was meant the principle of "unilateral conductivity or, in other words, a rectifier permitting current to flow in one direction only, *viz.*, from plate to filament and from grid to filament", as appears from the same page of the opinion. In the present case there is no

dispute that both the Fleming and De Forest tubes have this "unilateral conductivity". But the question there, as is the question here, was whether the addition of the grid and local battery avoided infringement.

Defendant's brief (p. 171) also quotes a similar statement from the opinion of the circuit court of appeals, 243 Fed. 465, in considering the issue of infringement of some De Forest counterclaim patents (not the Fleming patent) by Marconi diodes and triodes, where it was said "it is agreed that the 'two' and 'three electrode audions' operate on the same basic principle", 243 Fed. 465. Here again the "principle" was unilateral conductivity, and there was no agreement that the De Forest triodes infringed the Fleming patent. And, as above pointed out, infringement was contested in the court of appeals as well as in the district court.

The Fleming patent was infringed, if it contains patentable subject matter over the prior art, which it does.

### CONCLUSION

This case is not like *Detrola v. Hazeltine*, 313 U. S. 259, where a 1927 diode circuit in the radio art was held unpatentable, nor *Cuno Engineering v. Automatic Devices*, 314 U. S. 84, where a 1929 cigar lighter patent was held invalid. The Marconi and Fleming inventions were made in the pioneer days of wireless, when little was known, and most of that was wrong.

*Minerals Separation, Ltd. v. Butte & Superior Mining Co.*, 250 U. S. 336, 345:

"It is always difficult to recover the realities of a situation long past, such as we have here, but it is especially difficult when the importance of the

discovery has led, as in this case, to extensive improvements in mechanical appliances for utilizing the invention and to large additions to the knowledge of the adaptability to the process of various oils, singly and in combination."

*Kintner v. Atlantic Communication Co.*, 249 Fed. (D. C., S. D., N. Y.), 73, 77-8, was a suit on a radio patent and the court in 1917 said:

"In approaching the subject, it is extremely important to think, if possible, as of 1901. In this case, that is a troublesome task, because of the extraordinary progress in this art since then, and the consequent difficulty of discarding from consideration many items of after acquired knowledge. It is also necessary in this case not to accord undue importance to isolated suggestions in scientific papers and discussions. Such suggestions are not infrequently controlling in a well developed and well understood art where skilled men can readily appreciate the disclosure. In the infancy of a new, and, at the time, little understood, art, however, the alleged prior art, necessary to negative invention must be clear and doubts as to its meaning and disclosures should ordinarily be resolved in favor of the inventor."

The Marconi invention was a great advance in the practical art—it meant something useful to the public, and indeed was practically the only system employed for many years. At the risk of repetition, attention is again called to the unanimous verdict of the courts which considered it in the early days of the art, when the then realities of the situation could be more accurately appraised than today, those courts saying (plff's. main brief, p. 22), *National*

case (213 Fed. 841), a "conspicuous advance in wireless telegraphy" (p. 858); *Kilbourne & Clark* case (239 Fed. 328), "a real accomplishment" and the ideas involved in the patent "have proven of great value to the world" (pp. 335, 342); High Court of Justice, Chancery Division, "an entirely new and useful result" (4 R. 2557); and the Civil Tribunal of the Seine, in France, "a new and very important industrial result" and "a wonderful conquest" (4 R. 2641) and "the Marconi patent stands out as an unassailable monument until new discoveries are made" (4 R. 2674).

The Fleming invention was of even greater importance, because it contributed the hot cathode-cold anode tube to the radio art. The invention is widely used today in its original diode form, and also in the triode form, which, because of the De Forest grid and local battery, enables the tube to accomplish also the highly desirable result of amplification of electrical currents.

There was nothing in the prior art, which consists of merely laboratory experiments and unfruitful patented ideas, to anticipate the Marconi and Fleming patents. The multitude of prior papers and patents collected by defendant and contained in volumes 4 and 5 of the record are full of mistaken proposals and suggestions which led nowhere except to failures. It would have required ability of the highest order at that early time to have selected correctly the right principle to follow, even if it had been among the many advanced, which, however, was not the case.

If Marconi and Fleming made real inventions, as we believe, there is no substantial question but that their patents were infringed. The Court of Claims so declared with

respect to the Marconi patent, and it should have so found with respect to the Fleming patent, as indeed we have no doubt it would have, if the court had thought that Fleming was entitled to patent the high frequency rectifying operation described and claimed in his patent and upon which defendant's tubes depend for operation.

In Case 369, claims 1, 2, 3, 6, 8, 10 through 14, and 17 through 20 of the Marconi patent 763,772 should be held valid and infringed by the apparatus declared by the Court of Claims to infringe if the claims were valid; and claims 1 and 37 of the Fleming patent 803,684 should be held valid and infringed by defendant's triodes used as detectors or parts thereof, *and as oscillators.*

In Case 373, the judgment of the Court of Claims, that claim 16 of the Marconi patent was valid and infringed, and fixing compensation therefor, should be affirmed.

Respectfully submitted,

STEPHEN H. PHILBIN  
ABEL E. BLACKMAR, JR.  
RICHARD A. FORD

*Counsel for Petitioner and  
Cross-Respondent.*

April, 1943.

IN THE  
Supreme Court of the United States  
OCTOBER TERM, 1942

No. 369

MARCONI WIRELESS TELEGRAPH COMPANY  
OF AMERICA,

*Petitioner,*

*vs.*

THE UNITED STATES,

*Respondent.*

**Motion and Notice of Motion**

Sir:

PLEASE TAKE NOTICE that, upon the annexed affidavit of Abel E. Blackmar, Jr., verified the 25th day of November, 1942, the petitioner herein, Marconi Wireless Telegraph Company of America, by the undersigned, its counsel, hereby moves this Honorable Court for an order requiring respondent to reimburse petitioner for the cost of printing, and the fees of the Clerk of this Court for supervising the printing of, the required forty (40) copies of that portion of the printed transcript of the record herein which was included in the transcript and printed solely for use in connection with respondent's cross petition for a writ of certiorari (Case No. 373 of the October, 1942, Term of this Court) with respect to certain portions of the judgment

herein as to which petitioner has assigned no error, said portion of the printed transcript of the record comprising pages 2313 to 2522, inclusive, thereof, and for such other and further relief as may be proper in the premises.

Dated, November 25, 1942.

ABEL E. BLACKMAR, JR.,

RICHARD A. FORD,

*Counsel for Petitioner.*

To

THE HONORABLE THE SOLICITOR GENERAL

OF THE UNITED STATES,

*Counsel for Respondent,*

Washington, D. C.



IN THE  
SUPREME COURT OF THE UNITED STATES  
OCTOBER TERM, 1942

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No. 369

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MARCONI WIRELESS TELEGRAPH COMPANY  
OF AMERICA,

*Petitioner,*

*v.*

THE UNITED STATES,

*Respondent.*

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**Affidavit**

STATE OF NEW YORK )  
COUNTY OF WESTCHESTER ) ss.:

ABEL E. BLACKMAR, JR., being duly sworn, deposes and says:

That he is a member of the bar of this Court and of counsel for petitioner herein, and that he has been of counsel for petitioner throughout the proceedings in this cause in the court below since prior to the interlocutory judgment entered November 4, 1935, herein.

That this cause was instituted by petitioner in the Court of Claims of the United States, under the provisions of the Act of Congress of June 25, 1910 (amended July 1, 1918), U. S. Code, Title 35, Section 68, to recover compensation for the use, by respondent, of the subject matter of four

United States Letters Patent for invention, as more fully set forth in petitioner's Petition for Writ of Certiorari herein.

That the interlocutory judgment herein, among other things, held that claim 16 of Marconi patent No. 763,772 was valid and had been infringed by respondent. That thereafter, this cause was referred to a Commissioner of the Court of Claims to take the evidence on a proceeding to ascertain the amount of compensation to which petitioner was entitled by reason of respondent's infringement of said claim 16 and of certain claims of the Lodge patent No. 609,154, and to report thereon. That such report was made and the parties filed their exceptions thereto, which were duly heard by the Court of Claims. That said court thereupon rendered its final judgment herein, awarding compensation to petitioner for respondent's infringement of said claim 16 of the said Marconi patent and of the Lodge patent.

That, during the course of the accounting proceeding before the Commissioner, respondent introduced evidence directed to the issue of infringement of said claim 16 and argued, both before the Commissioner and before the Court of Claims, on final hearing, chiefly on the basis of such evidence, that the original decision of the Court of Claims on such issue was erroneous. That the Court of Claims, however, held that its interlocutory decision on this issue was the law of the case.

That, after the final judgment of the court below, deponent informed counsel for respondent that petitioner proposed to apply to this Court for a writ of certiorari with respect to the decision of the Court of Claims that the claims, *other than claim 16*, of the said Marconi patent were invalid and that the Fleming patent No. 803,684 had not been infringed. That deponent thereafter submitted to counsel for respondent a proposed transcript of the por-

tions of the record herein that deponent considered material to the errors which he intended to assign on behalf of petitioner; that this was done in the hope that the parties could agree on the record and thus avoid the difficulty, time, and great expense that would be involved both in the preparation of eight complete copies of the proposed record (both testimony and exhibits) for filing in the Court of Claims and for counsel, and in the submission of the record to the Court of Claims for settlement. That this portion of the record, including additional portions designated by counsel for respondent, was referred to, in correspondence between counsel, as "plaintiff's record".

That thereafter, counsel for respondent, in addition to designating such additional portions of plaintiff's record, also submitted, for inclusion in the proposed transcript, "extracts from the accounting testimony which the defendant desires to accompany its proposed cross-petition for certiorari, if the plaintiff's petition is allowed." (Letter of April 29, 1942, from Mr. C. V. Edwards, counsel for respondent, to deponent. The cross-petition is case No. 373 of the October, 1942, Term of this Court.) That this portion of the record, taken solely from the accounting proceeding and including additional parts designated by deponent, is material only to the issue of infringement of claim 16 of the said Marconi patent,—the subject matter of respondent's cross-petition,—and is not material to any of the issues assigned by petitioner, all of which were decided by the Court of Claims prior to the accounting proceeding. That, in correspondence between counsel, this portion of the record was referred to as "defendant's record".

That thereafter, counsel agreed upon the entire transcript of record—both those portions material to errors to be assigned by petitioner and those portions material to

errors to be assigned by respondent. That, prior to submission of the proposed transcript to the Court of Claims for certification, deponent was advised that the Court of Claims would not certify two records, one as plaintiff's record and the other as defendant's record. That the entire record was therefore submitted as a single record and has been printed as such for use both on petitioner's application for a writ of certiorari (No. 369) and on respondent's cross-petition (No. 373).

That petitioner moved, before the Court of Claims, for an order relieving it of the cost of certification of that portion of the record that was material solely to respondent's proposed cross-petition, but that the motion was denied without opinion. That, under Rule 101 of the Court of Claims, the Clerk's fee for preparing and certifying a transcript of the record for the purpose of a writ of certiorari is chargeable only when such transcript is "sought by plaintiff".

That the portion of the printed transcript of the record herein that is material solely to respondent's cross-petition is contained in pages 2313 to 2522, inclusive, thereof. That the said record was printed, in accordance with Rule 41 of this Court, under the supervision of the Clerk of this Court, and that the cost of printing, and of supervising the printing of, the entire record has been paid by petitioner.

That deponent is informed and believes that the cost of printing the required forty (40) copies of said pages 2313 to 2522, inclusive, of the transcript of the record amounted to Four Hundred and Eight and 85/100 Dollars (\$408.85); and that the fee of the Clerk of this Court for supervising the printing thereof was approximately Eighty-one and 70/100 Dollars (\$81.70).

WHEREFORE, deponent respectfully prays that this Court enter an order requiring respondent to pay to petitioner the sum of Four Hundred and Ninety and 55 100 Dollars (\$490.55) to reimburse it for the cost of printing, and of supervising the printing of, said portion of the record.

ABEL E. BLACKMAR, JR.

Subscribed and sworn to before me  
this 25th day of November, 1942.)

JOSEPHINE M. CESTONE

Notary Public, Westchester County, New York.

My Commission expires March 30, 1944.

[NOTARIAL SEAL]